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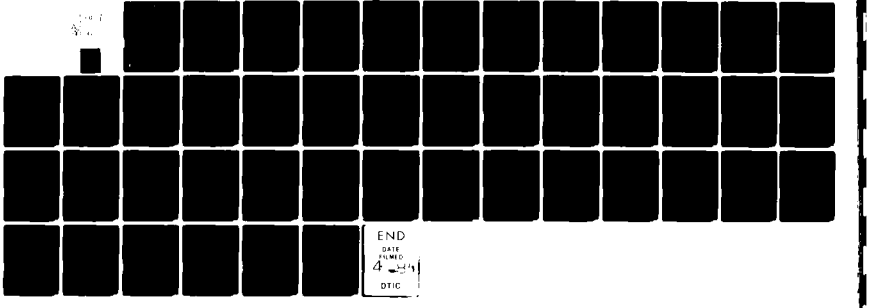

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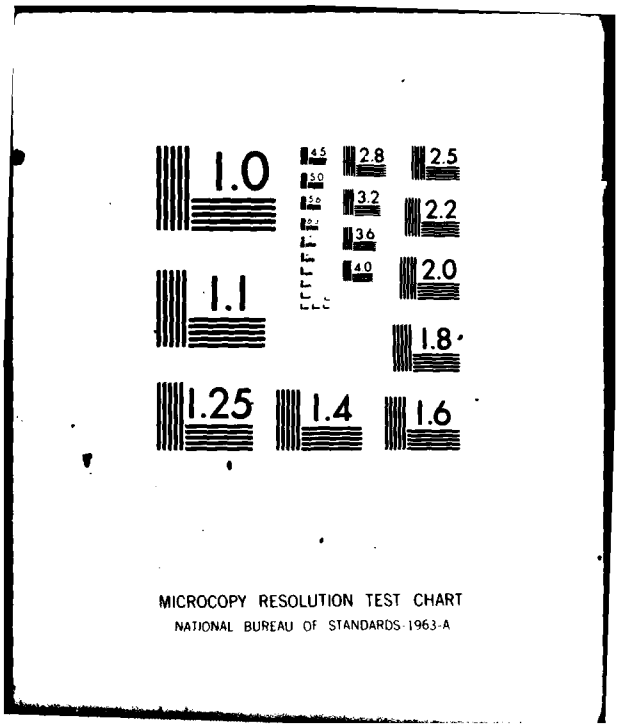
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

LEVEL II

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO. AD A096251

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
Functional Description of the Training and Personnel Systems Technology Information System.

5. TYPE OF REPORT & PERIOD COVERED
Final Task Report.

6. PERFORMING ORG. REPORT NUMBER
LMI Task ML007

7. AUTHOR(s)
Dennis J. O'Connor

8. CONTRACT OR GRANT NUMBER(s)
MDA 903-77-C-0370

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Logistics Management Institute
4701 Sangamore Road
Washington, D.C. 20016

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
Assistant Secretary of Defense
(Manpower, Reserve Affairs, and Logistics)

12. REPORT DATE
December 1980

13. NUMBER OF PAGES
44

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

15. SECURITY CLASS. (of this report)
Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

"A" Approved for public release; distribution unlimited

LMI ML007

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

DTIC ELECTE MAR 12 1981

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Manpower Research Information
Training and Personnel System Technology
Research Information System

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This document contains a functional description of the requirements for a Training and Personnel Systems Technology (TPST) research information system. The system will track the manpower-related research efforts sponsored by the Military Departments and by the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics). Information will be maintained for each Program Element, project, and task related to manpower research.

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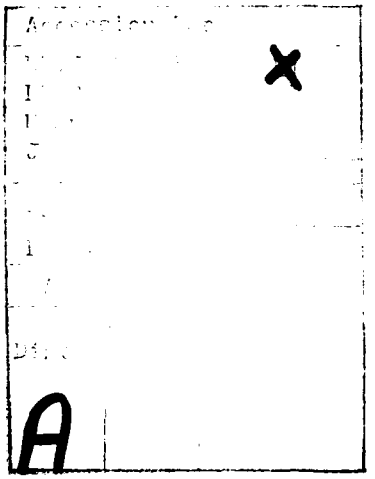
The research efforts will be categorized by performing organization, DOD Budget Categories, TPST program area, and goals. Other data will indicate funding, research plans, project description, and expected payoffs.

Also described in this document are the TPST system reports to be developed, such as fiscal tables, listings, and synopses. Users can directly access TPST data using the inquiry routine of the data base management system. Text searches will be an important feature for the inquiries.

The TPST system is expected to be used by planners and managers in OSD, in the Military Department headquarters, and in the research laboratories to describe the research program in general and to monitor research activities. Researchers can use the system to identify research efforts of others related to specific topics.

FUNCTIONAL DESCRIPTION OF THE TRAINING AND PERSONNEL SYSTEMS TECHNOLOGY INFORMATION SYSTEM



December 1980

Dennis J. O'Connor

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EXECUTIVE SUMMARY

BACKGROUND AND NEED FOR SYSTEM

The Training and Personnel Systems Technology (TPST) program is the primary people-related RDT&E program within the Department of Defense. In the past few years, as the program has grown, the need for detailed, up-to-date management information has increased. In particular, there has been substantial Congressional interest in the program. To meet this need, the Office of the Under Secretary of Defense, Research and Engineering and the Office of Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics are jointly developing a centralized automated information system covering all training and personnel technology programs which are funded by OSD and the Military Services. This system will assist in monitoring, coordinating, and reviewing projects by providing comprehensive data and flexible output formats for Congressional testimony and budget reviews.

A functional description of the TPST information system has been prepared in accordance with DoD standard 7935.1-S "Department of Defense Automated Data Systems Documentation Standards," dated 13 September 1977, which will provide documentation for system approval and for taking the next step in the development of this system - the computer programming.

WHAT THE SYSTEM WILL PROVIDE

The TPST system will give OSD and the Services access to accurate and timely data concerning all ongoing program elements, projects, and tasks in the TPST program. Historical data will be maintained in the system for work that is no longer active, if it has been entered as active beginning with FY80. The data base will include information on current and planned funding,

performing organizations, DoD Budget Categories, Congressional Categories (TPST program areas), program goals, research plans, and payoffs. While data to be included in the system are extensive, existing data sources will provide the majority required for the system.

Besides providing accurate and timely data, the system will provide the capability for processing the data and preparing summary reports. In addition to a set of standard management reports which are available from the system at the request of the user, the system will also provide for ad hoc management reports for analysis of TPST projects and programs. The TPST system will not only improve the capability of OSD and the Services to meet current information requirements for program management and Congressional reporting; but, with the special processing and computational routines embedded in the system, planners and managers will be able to undertake analyses not presently feasible such as program-wide fiscal cross tabulations, and detailed listings and descriptions of individual projects. The time required to prepare ad hoc reports will be greatly reduced since many of these types of report requests, which the Military Services now receive, will be prepared using the TPST system.

HOW THE TPST SYSTEM WILL FUNCTION

The TPST system will be operated by a System Manager, who will be responsible for entering and maintaining data and for providing user support. The Defense Technical Information Center (DTIC) and/or the Naval Personnel Research and Development Center (NPRDC) will serve as System Manager. It is also anticipated that the system will be operated on a DTIC computer. As a step toward this implementation, a prototype TPST system has been loaded on a Univac computer at DTIC and is being tested using the BASIS data base management system (DBMS).

Data inputs will be submitted by the Services in either hard copy form or on magnetic tape and sent to the System Manager for entry in the computer system. Program Element and project data will be entered four times a year while task data will be entered twice a year.

Each research organization in the TPST program as well as the system monitors in OUSDR&E and OASD(MRA&L) will have access to the system via low-speed interactive computer terminals. These users will have the capability of submitting on-line requests to the system from which output reports will be generated. Users with access to a high-speed printer will also be able to receive batch output.

TABLE OF CONTENTS

SECTION 1. GENERAL

1.1 PURPOSE OF FUNCTIONAL DESCRIPTION

This functional description for the Training and Personnel Systems Technology Information System will provide the following:

- A statement of user requirements to be satisfied by the system to serve as a basis for mutual understanding between user and developer.

- Information on performance requirements, system level design, user impacts, and development concepts to be employed.

1.2 PROJECT REFERENCES

Work on this project is authorized by LMI Task Order No. ML007 (MDA 0370-72), entitled "Policy Level Information on Manpower Research," undertaken by the Logistics Management Institute as requested by the Office of the Secretary of Defense. The project is sponsored by the Deputy Assistant Secretary of Defense for Resources, Requirements and Analysis and the Deputy Undersecretary of Defense for Research and Advanced Technology. The project is monitored by the Military Assistant for Training and Personnel Systems Technology, OUSDR&E and the Director, Research and Data, OASD (MRA&L). Users of the system will include the two monitors and the research organizations in the Training and Personnel Systems Technology (TPST) program as listed in Figure 1-1. The operating center will be located at the Defense Technical Information Center (DTIC). Management of the system and user support will be provided by the Naval Personnel Research and Development Center (NPRDC).

This system functional description is based on the products of a prototype system which were published in the "Training and Personnel Systems Technology R&D Program Description, FY80-81", and distributed to the TPST research organizations in June 1980.

FIGURE 1-1. TRAINING & PERSONNEL SYSTEMS TECHNOLOGY USERS RESEARCH ORGANIZATIONS

ARMY

ARI	Army Research Institute
HEL	Army Human Engineering Laboratory
PMTRADE	Project Manager for Training Devices

NAVY

HQMC	Headquarters, U.S. Marine Corps
NADC	Naval Air Development Center
NAMRL	Naval Aerospace Medical Research Laboratory
NAVAIR	Naval Air Systems Command
NAVELEX	Naval Electronic Systems Command
NAVSEA	Naval Sea Systems Command
NOSC	Naval Ocean Systems Center
NPRDC	Naval Personnel Research and Development Center
NSRDC	Naval Ship Research and Development Center
NSWC	Naval Surface Weapons Center
NTEC	Naval Training Equipment Center
ONR	Office of Naval Research

AIR FORCE

AMRL	Aerospace Medical Research Laboratory
HRL	Air Force Human Resources Laboratory
OSR	Air Force Office of Scientific Research
SIMSPO	Simulation System Project Office

SECTION 2. SYSTEM SUMMARY

2.1 BACKGROUND

The Office of the Secretary of Defense and the Military Departments need an information system to review, monitor, coordinate and manage training and personnel-related research. Until now there has been no single source of reliable data on the entire TPST program to serve this need. In the past when data was needed, a request would be sent to the TPST Laboratories, resulting in the use of staff-time for data collection and tabulation. Because of these procedures, the data have not been readily accessible or reliable, and have inhibited communication between DoD and Congress, between OSD and the Services, and among the laboratories in the program. The system outlined in this document is designed to provide the needed data and serve as an improved channel of communication between the parties involved.

2.2 OBJECTIVE

The primary objective of the TPST information system is to provide data for planning and management decision making which will:

- Provide timely information on the scope, content, and funding of the TPST program
- Link current TPST research with DoD objectives
- Provide comprehensive coverage of all TPST activities
- Provide reliable data and consistent terminology

2.3 EXISTING METHODS AND PROCEDURES

The Military Assistant for Training and Personnel Systems Technology, Office of the Undersecretary of Defense (Research and Advanced Technology) has management responsibility for overseeing the TPST program in the Military Departments. The Director, Research and Data, Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics), coordinates the research sponsored by OASD(MRA&L).

In the prototype phase, the Logistics Management Institute (LMI) has designed and developed a prototype system with the support and guidance of the project monitors in OSD. The system has been operating on a commercial time-sharing system using an IBM computer, the Model 204 data base system, and remote keyboard terminals as input/output devices and a high-speed printer at LMI for large volume output.

Inputs have consisted of fiscal data extracted from existing budget documents and program element/project synopses written specifically for the system. Outputs have consisted of ad hoc tables and listings requested by the project monitors, plus standard fiscal tables and project listings for the TPST program description document.

No formal procedures for data collection were established in the prototype phase. The Military Assistant for Training and Personnel Systems Technology was able to provide informal means of obtaining all the data required to provide useful outputs.

The current system has the following deficiencies which the new system will alleviate:

- Access to the system is not directly available to TPST laboratories.
- The commercial computer on which the system resides is very costly for data storage and report generation.
- There are no established procedures for data collection, validation and updating, including organizational responsibility for these functions.

2.4 PROPOSED METHODS AND PROCEDURES

The various improvements to the TPST system and their impacts are discussed below. The development schedule and responsibilities are identified in Section 6.

2.4.1 Summary of Improvements

The TPST Information System will provide the following improvements over the prototype system:

- The capability of generating output products which are not currently available (for example, text search outputs).
- The capability for the user to specify parameters of all report formats.
- A procedure will be developed for data collection, validation and updating in which each laboratory will submit data associated with its portion of the TPST program to the System Manager for inclusion in the system.
- Reduction of costs through use of a government-operated computer with technical support personnel at Defense Technical Information Center (DTIC) assigned to operate the system.
- Direct laboratory access to the system--each laboratory will have its own terminal(s) with which to make requests and receive output products.
- Responsibility for administration of the system transferred to a government activity to be known as the System Manager, thus insuring its on-going support.

In addition, the TPST system will incorporate the following features of the prototype system:

- A central, reliable source of program data

- Comprehensive coverage of the entire TPST and MRA&L program

- Fully-prompted query sequence for selected output formats

- Direct access to the data through data base management system (DBMS) capabilities

- Automated program to generate budget tables and project listings

- Ability to retrieve data on a wide range of sub-sets of the TPST program (for example, data on any single Congressional Category, Budget Category, Service, laboratory, program element or program goal)

- Ability to respond to data requests more quickly using less staff time

2.4.2 Summary of Impacts

2.4.2.1 Equipment Impacts

Listed below are the primary additions and modifications to the currently available equipment that are required:

- Transfer of the system from an IBM commercial time-sharing computer to a UNIVAC 1108 operated by DTIC.

- Capability of handling multiple (up to six) simultaneous users.

- Capability for nationwide remote teleprocessing at high and low speeds (4800 baud and 300 baud).

- All laboratories which desire direct access to the system will require a 300 baud teletype-compatible interactive device (terminal or CRT with upper and lower case characters); laboratories which desire batch output will require a 4800 baud, UNIVAC compatible terminal with printer and the proper communications links.

2.4.2.2 Software Impacts

Listed below are the additions and modifications needed in the existing applications and support software system in order to adapt them to the proposed TPST system:

- Transfer of Data Base from Model 204 to BASIS. The existing TPST report routines will require reprogramming to interface with a revised data structure and the BASIS routines. The transfer to BASIS and some reprogramming has been funded in FY80. Additional funding is required in 1981 to complete this step.

- The transfer of DBMS will also involve writing additional software to generate new output products and accommodate new methods of data entry and updating.

2.4.2.3 Organizational Impacts

Listed below are the primary organizational impacts of the proposed system:

- A System Manager will be required to maintain data and provide user support. It is anticipated that the DTIC/Naval Personnel Research and Development Center (NPRDC) will assume this role, involving post-implementation development and modification of software, insuring the accuracy of the data base including responsibility for all data updates, providing technical assistance to laboratory users, and maintaining a close working relationship with DTIC personnel in the daily administration and operation of the system.

- The Defense Technical Information Center (DTIC) will operate the UNIVAC computer on which the system will reside, as well as providing support for users who encounter hardware difficulties with the system.

- The TPST laboratories will provide data to the System Manager as required for periodic data base maintenance.

2.4.2.4 Operational Impacts

Listed below are the primary operational impacts of the proposed system:

- TPST planners and managers, both in OSD and in the Services and laboratories, will be able to access the TPST data base for immediate inquiry on current and historic program scope, content, and funding. On-line users will also be able to request preformatted reports to be run in batch mode.

- Financial data for all Program Elements (PEs) and projects will be collected four times each year (from Program Element Descriptions (PEDs) in the fall, from the President's Budget in January, from apportionment review documents in the summer, and actual figures at the end of the fiscal year (from PEDs)). Technical data for tasks will be collected twice a year (from apportionment review documents in the summer and at the end of the fiscal year from an undetermined source document).

- As mentioned above, data sources will include Program Element Descriptions, the President's Budget, and apportionment review documents as well as Program Element and project synopses written by each laboratory for all Program Elements and projects in its program, and a document which can provide actual funding of all tasks at the end of the fiscal year.

- When the proposed system is implemented and the System Manager assumes responsibility for the system, formal procedures will need to be established for the operation and use of the system. All user questions or problems related to the data or to the system will be handled by the System Manager.

- The prototype system on Model 204 will be discontinued.

2.4.2.5 Development Impacts

Minimal user effort will be required prior to installation of the system. It is expected that the system will be implemented in FY81 and that the System Manager will be identified to operate it.

2.5 ASSUMPTIONS AND CONSTRAINTS

Assumptions

Assumptions that will affect development and operation of the system are:

- That the UNIVAC 1108 at DTIC has sufficient capacity to support the TPST data base as well as its other planned applications.
- That BASIS will be an acceptable DBMS for the TPST system.
- That DTIC/NPRDC will be the System Manager and will begin operation of the system in January 1981.
- That LMI will be tasked in FY81 to complete the software development.

Constraints

Constraints that may affect development and operation of the system are:

- Given the distance between NPRDC in San Diego and DTIC in Alexandria, mutual support and communications may prove difficult.
- The amount of computer memory available on the UNIVAC 1108 (262K words) will be partitioned between the operating system and users of the system. If the only users of the system are TPST users, it is estimated that six users can be in core simultaneously. If non-TPST users are on the system, as is expected, fewer than six TPST users can be in core simultaneously.

SECTION 3. DETAILED CHARACTERISTICS

3.1 SPECIFIC PERFORMANCE REQUIREMENTS

The TPST system will be required to provide the following performance capabilities:

- Interactive display, retrieval, and query features.
- Fully prompted software programs to generate the interactive output formats specified in Section 3.3.1.
- Access to the system via interactive devices (terminals or CRTs).
- An automated report-generation procedure to provide the budget document formats specified in Section 3.3.2.5.

3.1.1 Accuracy and Validity

The accuracy requirements placed upon the system are as follows:

- The funding fields of individual records will be expressed in $Millions and will be accurate to the nearest $.001M ($1K). Transmitted data will be accurate at this level, except when reported in standard formats such as fiscal tables and synopses.
- Since all other fields will be expressed as character strings, rounding considerations for these fields are irrelevant.
- To insure the accuracy and reliability of the data, all new records will normally be added to the data base by the System Manager, who will also control record updating.

3.1.2 Timing

The TPST system will require a rapid response time for interactive output applications. Normal system response time should be within 1 minute for all output formats. Most large volume reports will be handled by batch processing; a norm of four-hour response time is desired, with a maximum acceptable response time of 24 hours. Installations without a high speed printer will need to allow additional time for delivery of outputs from DTIC.

The TPST Data Cycle

The annual, cyclic planning and management functions that the TPST system is designed to support determine the update schedule:

Oct-Nov - PED data for current year, plans for the following two years; actual data for previous year.

Jan - President's budget data for current year and revised plans for the following two years

March - PE and project synopses for current year

June-July - Apportionment review data for current year and revised plans for the following two years

3.2 SYSTEM FUNCTIONS

The TPST system will perform the following functions:

- Capability to produce four formats for interactive output reports as listed and illustrated in Section 3.3.2.
- Capability to retrieve selected data through index searches and text searches using the BASIS routines.
- An automated procedure to produce batch reports listed in Section 3.3.2.6.
- High volume batch data input.
- Low volume on-line data input.
- Batch update.

Figure 3-1 displays, in schematic form, the first three of the functions above--the on-line user operations. As indicated in the figure, the user will turn on his computer terminal, dial the appropriate telephone number, sign-on the UNIVAC 1108 and then onto the BASIS/TPST data base. After signing-on, three options will be available to him. The user has the choice of accessing one, two, or all three of these options in any order. There is no limit to the number of outputs which the user can generate during a terminal session. When he has finished generating outputs, the user signs off.

The data input and update functions are System Manager functions and will be performed as appropriate.

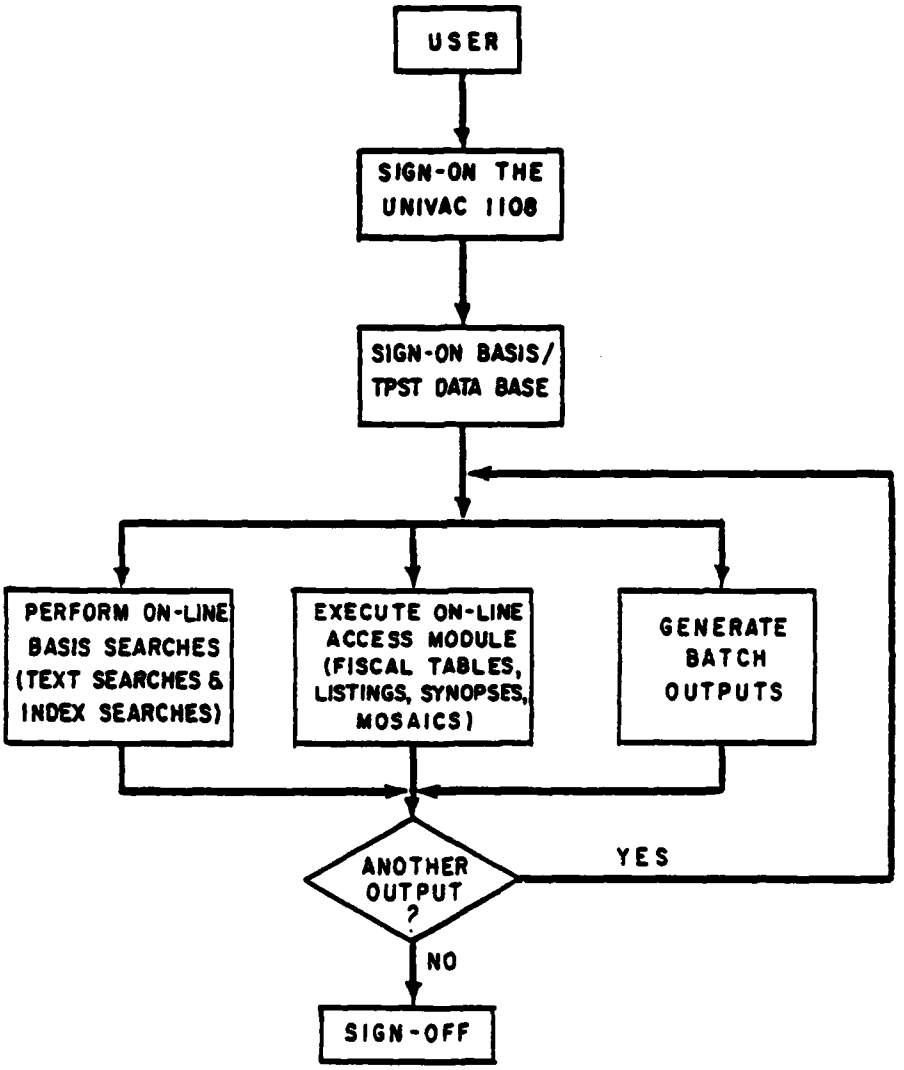
3.3 INPUTS-OUTPUTS

3.3.1 Inputs

As indicated earlier, the major sources of TPST program data will be budget documents (Program Element Descriptions, President's Budget, and Apportionment Review Documents) and PE/project synopses (to be written by the Services). The System Manager will be responsible for entering all Program Element, project and task records for each laboratory from the documents mentioned above. Data elements which are not included in the documents above (for example, Congressional Category and program goal) will be coded by the responsible research organization. Procedures for data reporting and entry, including a standard TPST form, will be developed by the System Manager as part of the implementation process.

BASIS DBMS utilities will be used for the input procedure. It is anticipated that no special programming will be required for data input. However, if input is generated from other automated systems, a program might be required

FIGURE 3-1. USER OPERATIONS



to format the data appropriately. Implementation procedures will be developed to manually verify and correct erroneous input data not checked by the DBMS.

The flow of input data is illustrated in Figure 3-2.

A list of the data elements and characteristics is shown in Figure 3-3.

3.3.2 Outputs

Four standard on-line output formats, designed especially for this system, will be available to the user:

1. Fiscal Tables to provide aggregations of TPST funding in cross-tabular form.

2. Listings to provide any list of Program Elements, projects, tasks or combination of these, selected by the user from the data base.

3. Synopses to provide textual summations of the work being done in all TPST Program Elements, projects, Congressional Categories and program goals.

4. Mosaics to display the distribution of work within the TPST program by selected data base fields for the purpose of analyzing system emphases.

In addition, the BASIS system itself provides retrieval capabilities, such as text search, which will be available to the user.

(Each standard format allows a user to specify the TPST data base fields to be used in generating output reports. For instance, a user can specify the row and column to be used in generating a fiscal table.) The following paragraphs describe the standard formats and present examples of each.

3.3.2.1 Fiscal Tables

Figure 3.4 is a sample fiscal table. It contains the following details:

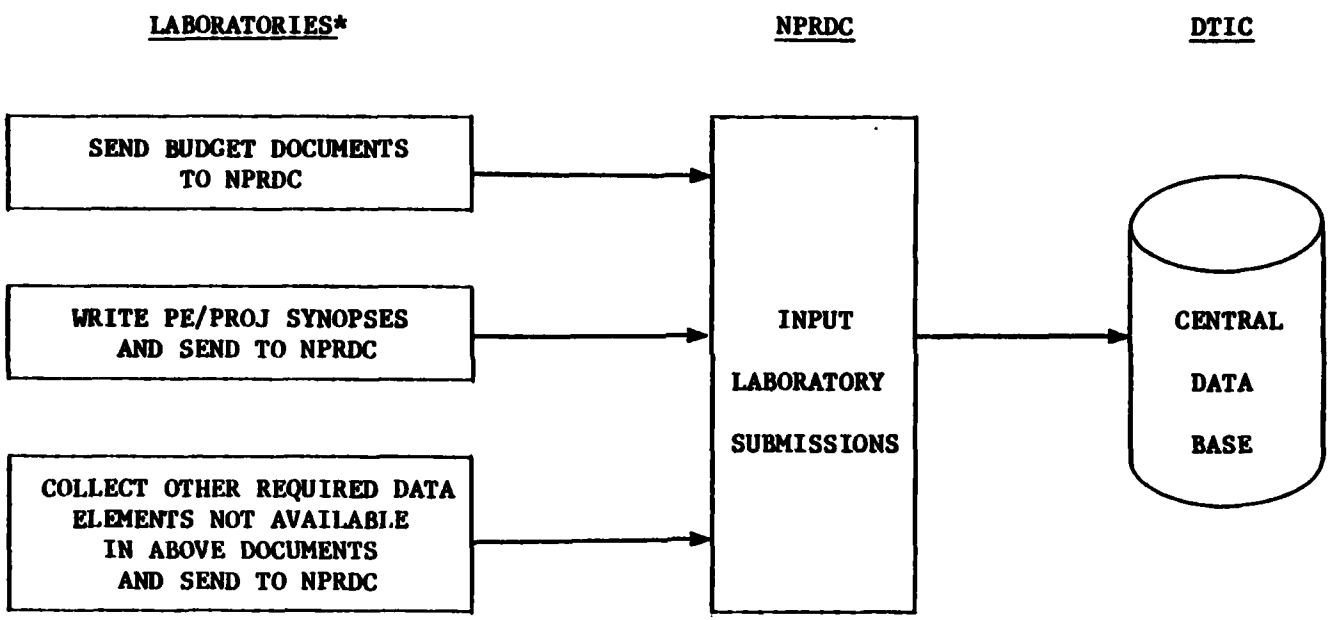
Header - The header is the title of the table, including the column and row variables, the budget document from which the data are taken, the fiscal year of funding, and the variables which define the subset of the data base used to generate the table (if any).

Body - The body consists of cells (formed by the rows and columns), each of which will have two values. The first is a funding value, expressed in $Millions, indicating the total funding of all Program Elements, projects, or tasks in the cell. For the second value, the user can choose one of the following three options: a row percentage (the fiscal value of the cell as a percentage of the row total), the column percentage (the fiscal value of the cell as a percentage of the column total), or a count of the number of projects (or tasks) which comprise the cell.

- A note explaining the use of any special symbols will be printed. (In the sample table, for instance, "--" indicates "no data".)

Tail - The tail consists of a list of the fields used to generate the table.

FIGURE 3-2. PROPOSED DATA FLOW



* Detailed laboratory procedures and forms for data submission will be determined prior to full system implementation.

FIGURE 3-3. TPST DATA ELEMENTS

Label	Type	Coded/ Text/ Numeric	Size	Indexing Mode	Prototype Data Elements	Source		
						PE	Proj	Task
Accession Number	I	N	7	I	*	9	9	9
Record Type	S	T-UC	4	I	*	9	9	9
Program Element Number	S	T-UC	6	I	*	1,2,3	1,2,3	3
Project Number	S	T-UC	10	I	*	N/A	1,2,3	3
Task Number	S	T-UC	12	I		N/A	N/A	3
Title	S	T-LC	60	I	*	1,2,3	1,2,3	3
DoD Organization	S	T-UC	4	I	*	1,2,3	1,2,3	3
Responsible Organization	S	C	8	I	*	N/A	1,2,3	3
Budget Category	R	N	3	R	*	1,2,3	1,2,3	3
Congressional Category	S	C	2	I	*	3	3	3
Congressional Sub-Category	S	C	2	I		3	3	3
Program Goal	S	C	1	I	*	N/A	3	3
Program Sub-Goal	S	C	2	I		N/A	3	3
Related Program Goal	S	C	1	I		N/A	3	3
Related Program Sub-Goal	S	C	2	I		N/A	3	3
Initiation Date	S	N	6	R				
Completion Date	S	N	6	R				
Principal Investigator		T-LC	30	I		N/A	3	
Coordinated Research Efforts	S	C	2	I				
Sort Key for DoD	S	T-UC	7	I		9	9	9
Synopsis		T-LC	9,000			4	4	4
Payoff/Utilization		T-LC				4	4	4
Future Direction		T-LC				4	4	4
Contract Title	S	T-LC	60	I			3	
Contractor Name	S	T-LC	30	I				
Contract Length (Months)	S	N	3	R				
Contract Funding	S	N	25	R				
Contract Years	S	T	20	I				
2nd Contract Title	S	T-LC	60	I				
2nd Contractor Name	S	T-LC	30	I				
2nd Contract Length	S	N	3	R				
2nd Contract Funding	S	N	25	R				
2nd Contract Years	S	N	20	I			3	
Latest Funding Field Number	I	N	3	I		1,2,3	1,2,3	3
Planned Figures, Next Two Years	R	N	10	I	*	1,2,2	1,2,3	3
Years for Planned Figures	S	N	9	I	*	1,2,3	1,2,3	3
FY80 Revised President's Budget Funding	R	N	6	R	*	1,2,3	1,2,3	3
FY80 Actual Funding								
FY81 PED Funding								
FY81 President's Budget Funding								
FY81 Apportionment Funding								
FY81 Actual Funding								
FY82 PED Funding								
FY82 President's Budget Funding								
FY82 Apportionment Funding								
FY82 Actual Funding								
FY83 PED Funding								
FY83 President's Budget Funding								
FY83 Apportionment Funding								
FY83 Actual Funding								
FY84 PED Funding								
FY84 President's Budget Funding								
FY84 Apportionment Funding								
FY84 Actual Funding								
FY85 PED Funding	R	N	6	R		1,2,3	1,2,3	3

NOTES: All data elements in BASIS are of variable length, however, no record may exceed 10,000 characters.

"TITLE" is used to identify the title of the following fields: Program Element, Project, Task, Congressional Category, Program Goal, Responsible Organization, Budget Category.

KEY: Type - I = Integer, R = Real, S = String

Coded/Text/Numeric -
- C = Coded
- T-UC = Text - Upper Case Only
- T-LC = Text - Lower and Upper Case
- N = Numeric

Indexing Mode - I = Index, R = Range

Source
- 1 = Program Element Description (PED)/ RDT&E Descriptive Summary
- 2 = President's Budget
- 3 = Apportionment Review Data Documents
- 4 = Synopsis/Payoff Documents
- 9 = System Manager or Machine Generated

FIGURE 3-4. FISCAL TABLE FORMAT

TPST PROGRAM FUNDING IN FY81
BASED ON FY80/REVISED PRESIDENT'S BUDGET
FOR MANPOWER AND PERSONNEL PROJECTS
BY GOAL AND BUDGET CATEGORY WITHIN DOD ORGANIZATION

FY81 ($MILLIONS)

DOD ORGANIZATION	BUDGET CATEGORY	GOAL MULT	1	2	3	4	5	6	7	TOTAL
ARMY										
	6.1 <81>	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX
	(R%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)
	6.2 <81>	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX
	(R%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)
	ETC.									
	ARMY TOTAL	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX
		(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)
NAVY										
	6.1 <81>	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX
	(R%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)
	6.2 <81>	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX
	(R%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)
	ETC.									
	NAVY TOTAL	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX
		(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)
ETC.										
	DOD TOTAL <81>	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX	XXX.XX
	(R%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)	(XXX%)

THE PARAMETERS OF THIS TABLE ARE:
COLUMN VARIABLE--PROGRAM GOAL
INNER ROW--BUDGET CATEGORY
OUTER ROW--DOD ORGANIZATION
FISCAL YEAR--FY81
BUDGET/MILESTONE--FY80/REVISED PRESIDENT'S BUDGET
SELECT VALUE--CONGRESSIONAL CATEGORY=MANPOWER AND PERSONNEL
DEFAULT--PROJECT DATA IS TABULATED UNLESS THE USER CHOOSES TO TABULATE TASK DATA OR PROGRAM ELEMENT DATA
PERCENTAGES/COUNTS--ROW PERCENTAGES

LIST OF PROGRAM GOALS:
1. ANALYSIS AND REQUIREMENTS FOR FULL-TIME PERSONNEL
2. ANALYSIS AND REQUIREMENTS FOR THE RESERVE FORCE
3. TRAINING AND TRAINING EQUIPMENT
4. SYSTEMS ACQUISITION AND DEVELOPMENT REQUIREMENTS
5. PRODUCTIVITY AND WORK PERFORMANCE
6. SUPPORT SYSTEMS
7. OPERATION READINESS AND PROFICIENCY
MULT. MULTIPLE GOAL ASSIGNMENT

NOTES FOR FIGURE 3-4
FISCAL TABLE

1. The user can choose any table variable (see Figure 3-5) for the inner and outer rows, but due to the 80-column width of most terminals, only the following can be column variables: program goal, Budget Category, Congressional Category, DoD organization.

2. If the user wants to generate a table with only selected values of a row or column variable, he can specify the values that he desires. For instance, if a user enters "Budget Category" as the column variable and is interested in only 6.1 and 6.2 funds, he can also enter 6.1 and 6.2 as the column headings so only those values will be tabulated.

FIGURE 3-5. LIST OF TPST FISCAL TABLE VARIABLES

	ROW VARIABLES	COLUMN VARIABLES
1. Congressional Category	X	X
2. Congressional Sub-category (tasks only)	X	
3. Program Goal	X	X
4. Program Sub-goal (tasks only)	X	
5. Budget Category	X	X
6. DoD Organization	X	X
7. Research Organization	X	
8. Program Element	X	

3.3.2.2 Listings

Figure 3-6 is a sample listing, with the following features:

Header - The header consists of the title of the listing. (For example, "Listing of Air Force TPST Program in Human Factors" in Figure 3-6)

Body - The body of the output consists of four parts.

First, the data fields that the user has chosen as column headings. Due to page width constraints, only a few columns may be selected.

Second, a list of Program Elements, projects or tasks (or combination of these) which meet the user's selection criteria along with the associated data for each column variable. (In the sample listing, the criteria are "Air Force" and "Human Factors.")

Third, the total funding of the list is printed for each program element.

Fourth, the total funding of each Program Element on the list and the percent change in funding from the past year to the current year for each Program Element is provided.

FIGURE 3-6. LISTING FORMAT

TPST PROGRAM LISTING FOR AIR FORCE IN HUMAN FACTORS

PE/PROJECT	PERFORMING ORGANIZ.	FY80 ($M)	FY81 ($M)	CONG. CAT.	GOAL	PROGRAM ELEMENT/PROJECT TITLES
63751F						Innovations in Education and Training
1959	HRL	0.200	0.100	HF	4	Advanced Systems for Human Resources Support of Weapon System Development
2359	HRL	0.300	0.300	HF	6	Pilot Performance Management System
2362	HRL	0.300	0.300	HF	5	Computer Based Maintenance Aids
		0.800	0.700			Total Human Factors in PE (Revised President's Budget, April 1980)

Total Funding in Program Element 63751F:	FY80	FY81	% Change
FY80 President's Budget	1.600	1.700	6%

NOTES FOR FIGURE 3-6
LISTING FORMAT

1. In place of "Air Force in Human Factors" the user can select any other Service and/or Congressional Category, program goal, Budget Category, research organization. (For example, the user could request all Manpower and Personnel projects or all Navy projects with 6.1 and 6.2 funding, etc. For other examples, see the batch listings in Section 3.3.2.5.2.) The user could also select projects or tasks whose funding level has changed by a selected percentage since the previous year.

2. In place of "PE/Proj" in the first column, the user can choose any of the following sorts: Proj/Task; PE/Proj/Task; PE; Proj; Task.

3. In place of the columns shown, the user can also choose from the following: percent change in funding between any two available fiscal years, a count of tasks within each project on the list, or other fiscal year funding.

3.3.2.3 Synopses

There are four synopsis formats described below:

- Program Element Synopsis and Payoff/Utilization Statement
- Project Synopsis
- Congressional Category Synopsis
- Program Goal Synopsis

3.3.2.3.1 Program Element Synopsis and Payoff/Utilization Statement

Figure 3-7 is a sample PE synopsis, containing the following details:

Header - The header consists of the Program Element number, Program Element name, Congressional Categories within the Program Element, the organization(s) responsible for the work in the Program Element, and total funding for the current and following fiscal years.

Body - The body is composed of two sections:

First, a 100-200 word Program Element synopsis defining the need for the P.E. and describing the current and proposed work.

Second, a 100-200 word payoff/utilization synopsis which indicates the current and future benefits of the Program Element.

Tail - None.

FIGURE 3-7. PROGRAM ELEMENT SYNPOSIS AND PAYOFF/UTILIZATION STATEMENT FORMAT

PROGRAM ELEMENT SYNOPSIS AND PAYOFF/UTILIZATION STATEMENT

PE:	62716A	Human Factors in Military Systems
CONGRESSIONAL CATEGORY:		Human Factors
DoD ORGANIZATION:		ARMY
RESPONSIBLE ORGANIZATION:		Army Human Engineering Laboratory (HEL)
FUNDING:		FY 80 $6.7M (President's Budget) FY 81 $7.7M (Planned)

PE SYNOPSIS:

This program constitutes the Army's major exploratory development effort in the human engineering area. There are ten major work goals that were engendered by field commanders or by engineering project directives from the U.S. Army Materiel and Readiness Command (DARCOM). Topics covered include the design of protective clothing and equipment, design and test of ammunition handling and fire control systems for armor and artillery, design and evaluation of helicopter flight controls, test and evaluation of infantry weapons--in particular, tests related to combat in urban areas--and design of noise reduction techniques for combat vehicles.

PAYOFF/UTILIZATION:

Among the more dramatic accomplishments from this program has been the completion of a major phase of the Helfast Project. The results of this effort have served to validate design concepts and operational procedures for front-line delivery of heavy ordnance ammunition. Many of the design concepts were suggested directly from the research conducted by HEL personnel including the adaptation for combat applications of equipments in common use in the civilian sector for materials handling. A new step in this area has been the design of a lighting system for nighttime ammunition handling that enhances performance but has low detectability by hostile sensors.

Other typical specifics include the design of an idler for armored vehicles (e.g., M113-B4) that reduces interior noise levels by 10-12 DB.

3.3.2.3.2 Project Synopsis

Figure 3-8 is a sample project synopsis. It has the following features:

Header - The header consists of the project number and title (with funding indicators for fiscal years), Program Element number and title, Congressional Categories of the project, and the organization(s) responsible for the project.

Body - The body consists of the project number and title as well as a 100-200 word summary of the work being done on the project.

Tail - None.

FIGURE 3-8. PROJECT SYNOPSIS FORMAT

PROJECT SYNOPSIS

			80	81
PROJECT:	H70	Human Factors in Military Systems	X	X
PE:	62716A	Human Factors in Military Systems		
CONGRESSIONAL CATEGORY:		Human Factors		
DoD ORGANIZATION:		ARMY		
RESPONSIBLE ORGANIZATION:		Army Human Engineering Laboratory (HEL)		

- -

PROJECT SYNOPSIS

H70: Human Factors in Military Systems

The problems addressed under this project relate to the survival of the individual soldier, crew survival, protection from adverse environments, and enhancing the combat effectiveness of the total man-machine system. There are new directions evolving in each problem area. For example, new evaluation and design feedback is being obtained from field trials that can lead to a computer-aided fire control system for the artillery that will integrate the functions of target acquisition and designation with laying and firing. Non-electric communication between tanks in Electronic Counter-Measures (ECM) environments is also being evaluated. Prior success in enhancing nighttime ammunition handling is being extended to cover nighttime re-arm, refuel, and maintenance functions for helicopter operations. Decision aids for combat unit commanders fighting in urban areas are being developed that can help the commander determine the best mix of weapons and ammunition for specified targets. New work on tank turret controls, tank operations in mine fields and smoke/obscurbant situations, and tracked vehicle noise reduction are proceeding according to plan.

3.3.2.3.3 Congressional Category Synopsis

Figure 3-9 is a sample Congressional Category synopsis. It has the following features:

Header - The header consists of the Congressional Category being synopsized and of the Military Service, as well as the Program Elements managed by that Service in the Congressional Category.

Body - The body consists of a 200-400 word synopsis describing the work being done in the given Congressional Category by one Service.

Tail - None.

FIGURE 3-9. CONGRESSIONAL CATEGORY SYNOPSIS FORMAT

CONGRESSIONAL CATEGORY SYNOPSIS

CONGRESSIONAL CATEGORY:	Education and Training
DoD ORGANIZATION:	ARMY
CONTRIBUTING PROGRAM ELEMENTS:	61102A Defense Research Sciences
	62722A Manpower, Personnel and Training
	63743A Education and Training

SYNOPSIS:

Education is a major function within the Army and, consequently, research and development directed toward the improvement of educational techniques is of vital importance. At the most basic level, for example, the Army is required to provide various forms of compensatory education in literacy skills and mathematical competency for new recruits. One approach to meeting this requirement has been the development of individualized, self-paced techniques that permit modes of learning that are distinctive from those in the civilian experiences of the recruit.

This approach has also been extended into the field for advanced skill training for both combat and technical skills. A specific application projected for the upcoming fiscal period is the development of self-instructional packages for non-commissioned officer training. Such an application provides a relevant instance for the Army's emphasis on rigorous evaluation of such innovations. Outcomes will be checkes and re-checked to ensure that the leadership skills are truly acquired and can be applied by the trainee in operational situations.

Along the same line of reasoning, another point of emphasis is the planning and management of training programs in the field. Unit commanders must invest substantial resources in the management of the training programs they are required to undertake. A specific point is the need to be able to assess the actual effect of such programs on unit combat readiness. Research and development work within this category is providing better tools for performance measurement so that any deficiencies can be accurately detected and corrective actions can be quickly put in hand.

3.3.2.3.4 Program Goal Synopsis

Figure 3-10 is a sample program goal synopsis, with the following features:

Header - The header consists of the name and number of the goal being synopsized and the name of the Military Service, as well as the Program Elements managed by that Service within the goal.

Body - The body consists of a 200-400 word synopsis describing the work being done in the given goal area by one Service.

Tail - None

FIGURE 3-10. PROGRAM GOAL SYNOPSIS FORMAT

PROGRAM GOAL SYNOPSIS

GOAL AREA: 1. *Analysis and Requirements for Full-Time Personnel*

DoD ORGANIZATION: ARMY

CONTRIBUTING PROGRAM ELEMENTS:
61102A Defense Research Sciences
62722A Manpower, Personnel and Training
63731A Military Personnel Performance Development

SYNOPSIS:

A central theme for the Army work in this Goal Area ia the determination of human resource requirements that arise from the acquisition of new weapon systems. Present analyses suggest that the demand for highly competent personnel to operate and maintain the systems about to enter the Army's inventory exceeds the expected supply. This circumstance will generate increasing pressure on the management of recruitment, assignment, and retention programs. One approach to moderating the pressure is to develop better means of handling incentives. Part of the problem is in understanding the patterns of motivation for prospective recruits, first-term personnel and those who have entered the Career Force. When the motivational patterns are clear, management of the non-monetary and mainly non-tangible incentives can become far more precise. Research and development efforts are proceeding along these lines.

In more specific terms, recent work has been focused on mapping the characteristics of the manpower supply, developing better methods for measuring aptitudes for particular military jobs, helping recruiters understand their functions, and supporting efforts to make unit membership an important value for each soldier.

New work will emphasize the measurement of capabilities and aptitudes for most efficient selection and assignment and the development of the means (such as computer-based systems) for disseminating the resultant data to those who must make personnel management decisions.

3.3.2.4 Mosaic

Figure 3-11 is a sample mosaic for task coverage. For project coverage, all references to sub-goals will be omitted. The mosaic format has the following features:

Header - The header will consist of the title of the mosaic, including identification of project or task coverage, the column and row variables, the budget and fiscal year from which the data are taken, the subset of the data base from which the mosaic was generated (if any).

Body - If the user selects project coverage, then only program goals will appear as columns. For task coverage, both program goals and sub-goals will appear.

- The body consists of cells (formed by the rows and columns), each of which can have one of three values:

  -- An asterisk, indicating the existence of at least one project (or task, if selected by the user) with the column value as its primary goal.

  -- A hyphen indicating the existence of a project (or task) with the column value as its secondary goal.

  -- A blank, indicating the existence of no projects (or tasks) with the column value as its primary or secondary goal.

Tail - List of program goals.

FIGURE 3-11. MOSAIC FORMAT

TPST TASK COVERAGE OF PROGRAM GOALS AND SUB-GOALS BY DoD ORGANIZATION IN FY81 BASED ON FY80 PRESIDENT'S BUDGET

Program Goals and Sub-Goals

	1	2	3	4	5	6	7
	ABCDE	ABCDE	ABCDEFG	ABCDEFGHI	ABCDEF	ABCDEFGH	ABC
OSD	**-**	*-**-	--	*-----		*	*-*
ARMY	---*-	-***-	*******	******--*	*-*-**	**- **	
NAVY	*****	--**-	***** *	-********	*-****	******--	
A.F.	*****	--**-	*-*** -	***--****	*---**	**- ----	-

List of Program Goals

1. Analysis and Requirements for Full-Time Personnel
2. Analysis and Requirements for the Reserve Force
3. Training and Training Equipment
4. Systems Acquisition and Development Requirements
5. Productivity and Work Performance
6. Support Systems
7. Operational Readiness and Proficiency

NOTES FOR FIGURE 3-11
MOSAIC FORMAT

1. In a mosaic, "Program Goal" is always the column heading. However, any of the following variables can be chosen as the row variable: DoD organization, research organization, Congressional Category, Budget Category, Program Element.

3.3.2.5 Batch Formats

A series of tables, listings, and synopses, as defined below, will be produced from the system on request.

3.3.2.5.1 Batch Tables

There are 12 batch tables that can be selected, each of which follows the fiscal table format shown in Figure 3.4. All tables will be generated from project records for the current and following fiscal year based on the latest available data. The batch tables will have the following parameters:

T1 - Budget Categories by DoD Organization

T2 - Congressional Categories by DoD Organization

T3 - Congressional Categories by Program Element
within DoD Organization

T4 - Congressional Categories by Budget Category

T5 - Congressional Categories by Budget Category
within DoD Organization

T6 - Program Goals by Budget Category

T7 - Program Goals by Budget Category
within DoD Organization

T8 - Program Goals by Budget Category
within DoD Organization
for each Congressional Category

T9 - Program Goals by Congressional Category

T10 - Program Goals by DoD Organization

T11 - Congressional Categories by DoD Organization
within Budget Categories 6.1/6.2

T12 - Congressional Categories by DoD Organization
within Budget Categories 6.1/6.2/6.3

3.3.2.5.2 Batch Listings

The batch listing reports follow the listing format in Figure 3-6. The column headings are fixed as shown in that example, and the batch listings display only the PE and project level data as shown. The contents of the three listings are as follows:

L1 - Listing of Projects by Program Element for Each DoD Organization

L2 - Listing of Projects by Congressional Category for Each DoD Organization

L3 - Listing of Projects by Program Goal for Each DoD Organization

3.3.2.5.3 Batch Synopses

The batch synopses listed follow the four synopsis formats shown in Figure 3-7 through Figure 3-10.

S1 - Synopses of Program Elements for Each DoD Organization

S2 - Synopses of Projects for Each DoD Organization

S3 - Synopses of Congressional Categories for Each DoD Organization

S4 - Synopses of Program Goals for Each DoD Organization

3.4 DATA CHARACTERISTICS

- The data elements in the TPST data base and selected characteristics are listed in Figure 3-3.

- New records will be added at a rate of approximately 100 per year.

- It is estimated that the complete TPST data base will have 1.4M characters in the total data base and 1.1M characters in the data records (approximately 1000 records initially).

- For historical funding analysis, data records will be maintained indefinitely, thus causing the data base to grow by approximately 200 records each year. In the sixth year, the data base have approximately 2.8M characters.

3.5 FAILURE CONTINGENCIES

3.5.1 Back-up

Immediately preceding a batch update, a back-up copy of the data base files will be made. Back-up copies will be stored on disk and tape.

3.5.2 Fallback

The System Manager will generate a full listing of the data base each week and will retain this listing for reference in case of system failure.

3.5.3 Restart

The normal restart procedure for the update process is to load the back-up files and restart the latest update at its beginning.

SECTION 4. ENVIRONMENT

4.1 EQUIPMENT ENVIRONMENT

The equipment capabilities required for the operation of the TPST system are as follows:

- There must be adequate processing capability in the equipment and the DBMS to support five or six users at one time (peak loading). (The six are the System Manager plus 25% of the 20 potential users.) Usually, however, it is expected that no more than 1 or 2 users will be accessing the system at one time.

- One disk unit (minimum capacity 2.8 million characters) and one tape unit for archiving the data base will be required.

- At least twenty 300 BAUD, teletype compatible interactive devices (printing terminals or CRTs with upper and lower case characters) will be required as input/output devices. This includes at least one device at each TPST laboratory as well as terminals for OSD and Service headquarters. In addition, a 4800 BAUD UNIVAC compatible printer will be required for each user that desires batch reports. Some locations may already have the required terminal devices, and a dedicated terminal will generally not be needed for the TPST system.

- Data communications lines of two speeds will be required:

    1. Low speed (300 BAUD) for interactive devices
    2. High speed (4800 BAUD) for high-speed printer

At the present time, there appears to be no impediment to providing these capabilities at DTIC. Some additional terminals may have to be acquired, however.

4.2 SUPPORT SOFTWARE ENVIRONMENT

The support software with which the computer programs to be developed must interact are as follows:

Level	Title
33R3	UNIVAC EXEC 8 EXECUTIVE SYSTEM
7R1	FTN COMPILER
4	BASIS

4.3 INTERFACES

It is anticipated that the TPST system and the RDIS system will be merged at some future date. The merger should occur through the integration of the two

data bases into a single data base with common fields. Early in the process of TPST development, an analysis of the data fields in both systems should be made to define a set of consistent, common fields and field names. The merged data bases will then provide complete and compatible information on manpower related research from the highest level, the Program Element through the lowest level, the work unit.

4.4 SECURITY AND PRIVACY

All of the data in the TPST system will be unclassified and will be available for read access to all authorized users. Updating will be performed by the System Manager (NPRDC) using BASIS on-line or batch routines.

SECTION 5. COST FACTORS

The cost factors associated with the TPST Information System occur in three system phases:

- Development
- Implementation
- Ongoing Operations

5.1 DEVELOPMENT COSTS

Development effort will be required to generate the required custom programs and provide instructions to DBMS routines. The DBMS routines will likely be used for listings and synopses, and for entering data. On the other hand, custom software will be required for the on-line user interface and for generating fiscal tables and mosaics.

Development effort is also required to design the input forms and specify procedures for data base maintenance. Finally, a user's manual and system operations documentation must be produced. As of 1 October 1980, this development effort is expected to require approximately 2,000 man-hours in FY81.

The required computer services (including a DBMS) and telecommunications facilities are expected to be provided by DTIC beginning in the development phase and continuing through full system operations. It is anticipated that there will be no incremental system cost for these services.

5.2 IMPLEMENTATION COSTS

The initial implementation costs involve specifying the data base structure and loading existing data on the DBMS. These have been accomplished in FY80. After software development is finished in FY81, the System Manager and users should be trained in its operation and maintenance. TPST laboratories should also be informed of the system and in their role in submitting information. It is estimated that the training will require approximately 1,150 man-hours not including System Manager and laboratory personnel time.

5.3 OPERATIONS COSTS

The continuing operations-related costs for personnel and equipment will be incurred primarily by 1) the DTIC providing computer and telecommunications support for the system, 2) the System Manager (NPRDC) in data base maintenance and user support, and 3) the laboratories, which will provide the data.

It is anticipated that there will be no incremental cost to system users for the DTIC services. It has been estimated that annual NPRDC costs will be approximately $26,000 and the annual laboratory costs approximately $70,000 for 2,300 man-hours.

All users, including the laboratories, will require access to a low-speed computer terminal to communicate with DTIC. A "lower case" keyboard capability in the terminal will be required for text searches. The existing high speed terminals used by the laboratories could also be used to retrieve batch reports from DTIC. The cost of low-speed terminals is estimated at $1,800 per year for each terminal required.[2]

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[1]Estimates for the Research and Development Information System/TPST interface are contained in Table 3 of the Presearch Incorporated report "Defense Research and Studies Information System (DRSIS): Phase 2A Requirements," 12 August 1980.

[2]Ibid.

SECTION 6. SYSTEM DEVELOPMENT PLAN

In order to develop and implement the TPST system successfully, the participation and liaison of the following organizations will be required:

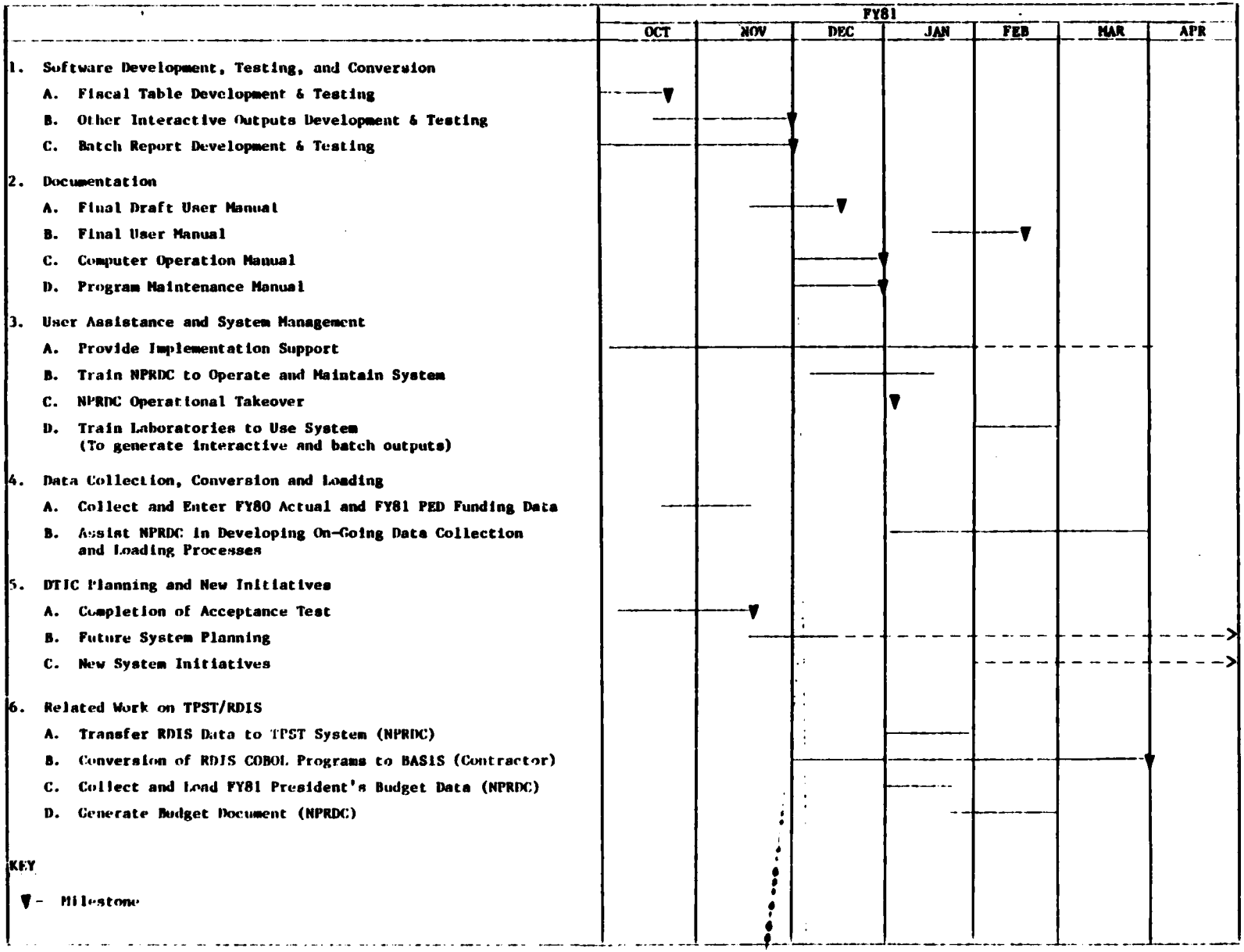
- The Defense Technical Information Center (DTIC) and/or the Naval Personnel Research and Development Center (NPRDC) to serve as System Manager with responsibility for administering the data base, updating the data at the prescribed milestones and responding to user problems and inquiries.

- The Defense Technical Information Center (DTIC) to serve as system host and operator. DTIC will provide the mainframe computer on which the system will operate and telecommunications facilities for interactive devices, as well as personnel for normal machine operations.

- A system development contractor will assist NPRDC in the implementation of system software, the transfer of operational control to NPRDC, and user support for update problems and for special analyses and tabulations.

The sequence of tasks to be performed in the development and implementation of the TPST system is presented in Figure 6-1. The time schedule is planned as of 1 October 1980 assuming full coordination and acceptance by all organizations involved.

FIGURE 6.1 TPST INFORMATION SYSTEM DEVELOPMENT & IMPLEMENTATION SCHEDULE

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